MC74AC240, MC74ACT240

Octal Buffer/Line Driver with 3-State Outputs

The MC74AC240/74ACT240 is an octal buffer and line driver designed to be employed as a memory address driver, clock driver and bus oriented transmitter or receiver which provides improved PC board density.

- 3−State Outputs Drive Bus Lines or Buffer Memory Address Registers
- Outputs Source/Sink 24 mA
- ′ACT240 Has TTL Compatible Inputs

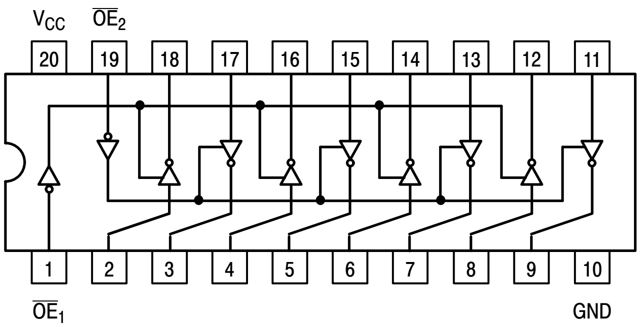


Figure 1. Pinout: 20−Lead Packages Conductors
(Top View)

TRUTH TABLE

Inputs		Outputs
$\overline{OE}_1$	D	(Pins 12, 14, 16, 18)
L	L	H
L	H	L
H	X	Z

NOTE: H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial
Z = High Impedance

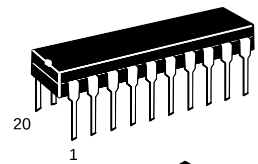
TRUTH TABLE

Inputs		Outputs
$\overline{OE}_2$	D	(Pins 3, 5, 7, 9)
L	L	H
L	H	L
H	X	Z

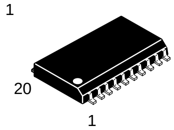
NOTE: H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial
Z = High Impedance

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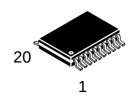
http://onsemi.com



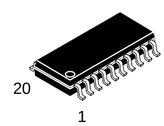
PDIP−20
N SUFFIX
CASE 738



SO−20
DW SUFFIX
CASE 751D



TSSOP−20
DT SUFFIX
CASE 948E



EIAJ−20
M SUFFIX
CASE 967

ORDERING INFORMATION

Device	Package	Shipping†
MC74AC240N	PDIP−20	18 Units/Rail
MC74ACT240N	PDIP−20	18 Units/Rail
MC74AC240DW	SOIC−20	38 Units/Rail
MC74AC240DWR2	SOIC−20	1000 Tape & Reel
MC74ACT240DW	SOIC−20	38 Units/Rail
MC74ACT240DWR2	SOIC−20	1000 Tape & Reel
MC74AC240DTR2	TSSOP−20	2500 Tape & Reel
MC74ACT240DTR2	TSSOP−20	2500 Tape & Reel
MC74AC240MEL	EIAJ−20	2000 Tape & Reel
MC74ACT240MEL	EIAJ−20	2000 Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

DEVICE MARKING INFORMATION

See general marking information in the device marking section on page 5 of this data sheet.

MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	DC Supply Voltage (Referenced to GND)	−0.5 to +7.0	V
V_{IN}	DC Input Voltage (Referenced to GND)	−0.5 to V_{CC} +0.5	V
V_{OUT}	DC Output Voltage (Referenced to GND)	−0.5 to V_{CC} +0.5	V
I_{IN}	DC Input Current, per Pin	±20	mA
I_{OUT}	DC Output Sink/Source Current, per Pin	±50	mA
I_{CC}	DC V_{CC} or GND Current per Output Pin	±50	mA
T_{stg}	Storage Temperature	−65 to +150	°C

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter		Min	Typ	Max	Unit
V_{CC}	Supply Voltage	′AC	2.0	5.0	6.0	V
		′ACT	4.5	5.0	5.5	
V_{IN}, V_{OUT}	DC Input Voltage, Output Voltage (Ref. to GND)		0	−	V_{CC}	V
t_r, t_f	Input Rise and Fall Time (Note 1) ′AC Devices except Schmitt Inputs	V_{CC} @ 3.0 V	−	150	−	ns/V
		V_{CC} @ 4.5 V	−	40	−	
		V_{CC} @ 5.5 V	−	25	−	
t_r, t_f	Input Rise and Fall Time (Note 2) ′ACT Devices except Schmitt Inputs	V_{CC} @ 4.5 V	−	10	−	ns/V
		V_{CC} @ 5.5 V	−	8.0	−	
T_J	Junction Temperature (PDIP)		−	−	140	°C
T_A	Operating Ambient Temperature Range		−40	25	85	°C
I_{OH}	Output Current − High		−	−	−24	mA
I_{OL}	Output Current − Low		−	−	24	mA

1. V_{IN} from 30% to 70% V_{CC}; see individual Data Sheets for devices that differ from the typical input rise and fall times.
2. V_{IN} from 0.8 V to 2.0 V; see individual Data Sheets for devices that differ from the typical input rise and fall times.

DC CHARACTERISTICS

Symbol	Parameter	V_{CC} (V)	74AC T_A = +25°C Typ	74AC T_A = +25°C Guaranteed Limits	74AC T_A =−40°C to +85°C Guaranteed Limits	Unit	Conditions
V_{IH}	Minimum High Level Input Voltage	3.0 4.5 5.5	1.5 2.25 2.75	2.1 3.15 3.85	2.1 3.15 3.85	V	V_{OUT} = 0.1 V or V_{CC} − 0.1 V
V_{IL}	Maximum Low Level Input Voltage	3.0 4.5 5.5	1.5 2.25 2.75	0.9 1.35 1.65	0.9 1.35 1.65	V	V_{OUT} = 0.1 V or V_{CC} − 0.1 V
V_{OH}	Minimum High Level Output Voltage	3.0 4.5 5.5	2.99 4.49 5.49	2.9 4.4 5.4	2.9 4.4 5.4	V	I_{OUT} = −50 µA
		3.0 4.5 5.5	− − −	2.56 3.86 4.86	2.46 3.76 4.76	V	*V_{IN} = V_{IL} or V_{IH} −12 mA I_{OH} −24 mA −24 mA
V_{OL}	Maximum Low Level Output Voltage	3.0 4.5 5.5	0.002 0.001 0.001	0.1 0.1 0.1	0.1 0.1 0.1	V	I_{OUT} = 50 µA
		3.0 4.5 5.5	− − −	0.36 0.36 0.36	0.44 0.44 0.44	V	*V_{IN} = V_{IL} or V_{IH} 12 mA I_{OL} 24 mA 24 mA
I_{IN}	Maximum Input Leakage Current	5.5	−	±0.1	±1.0	µA	V_I = V_{CC}, GND
I_{OZ}	Maximum 3−State Current	5.5	−	±0.5	±5.0	µA	V_I (OE) = V_{IL}, V_{IH} V_I = V_{CC}, GND V_O = V_{CC}, GND
I_{OLD}	†Minimum Dynamic Output Current	5.5	−	−	75	mA	V_{OLD} = 1.65 V Max
I_{OHD}		5.5	−	−	−75	mA	V_{OHD} = 3.85 V Min
I_{CC}	Maximum Quiescent Supply Current	5.5	−	8.0	80	µA	V_{IN} = V_{CC} or GND

*All outputs loaded; thresholds on input associated with output under test.
†Maximum test duration 2.0 ms, one output loaded at a time.

NOTE: I_{IN} and I_{CC} @ 3.0 V are guaranteed to be less than or equal to the respective limit @ 5.5 V V_{CC}.

AC CHARACTERISTICS (For Figures and Waveforms − See Section 3 of the ON Semiconductor FACT Data Book, DL138/D)

Symbol	Parameter	V_{CC}* (V)	74AC T_A = +25°C C_L = 50 pF			74AC T_A = −40°C to +85°C C_L = 50 pF		Unit	Fig. No.
			Min	Typ	Max	Min	Max		
t_{PLH}	Propagation Delay Data to Output	3.3 5.0	1.5 1.5	6.0 4.5	8.0 6.5	1.0 1.0	9.0 7.0	ns	3−5
t_{PHL}	Propagation Delay Data to Output	3.3 5.0	1.5 1.5	5.5 4.5	8.0 6.0	1.0 1.0	8.5 6.5	ns	3−5
t_{PZH}	Output Enable Time	3.3 5.0	1.5 1.5	6.0 5.0	10.5 7.0	1.0 1.0	11.0 8.0	ns	3−7
t_{PZL}	Output Enable Time	3.3 5.0	1.5 1.5	7.0 5.5	10.0 8.0	1.0 1.0	11.0 8.5	ns	3−8
t_{PHZ}	Output Disable Time	3.3 5.0	1.5 1.5	7.0 6.5	10.0 9.0	1.0 1.0	10.5 9.5	ns	3−7
t_{PLZ}	Output Disable Time	3.3 5.0	1.5 1.5	7.5 6.5	10.5 9.0	1.0 1.0	11.5 9.5	ns	3−8

* Voltage Range 3.3 V is 3.3 V ±0.3 V.
Voltage Range 5.0 V is 5.0 V ±0.5 V.

DC CHARACTERISTICS

Symbol	Parameter	V_{CC} (V)	74ACT T_A = +25°C		74ACT T_A = −40°C to +85°C	Unit	Conditions
			Typ	Guaranteed Limits			
V_{IH}	Minimum High Level Input Voltage	4.5 5.5	1.5 1.5	2.0 2.0	2.0 2.0	V	V_{OUT} = 0.1 V or V_{CC} − 0.1 V
V_{IL}	Maximum Low Level Input Voltage	4.5 5.5	1.5 1.5	0.8 0.8	0.8 0.8	V	V_{OUT} = 0.1 V or V_{CC} − 0.1 V
V_{OH}	Minimum High Level Output Voltage	4.5 5.5	4.49 5.49	4.4 5.4	4.4 5.4	V	I_{OUT} = −50 μA
		4.5 5.5	− −	3.86 4.86	3.76 4.76	V	*V_{IN} = V_{IL} or V_{IH} I_{OH} −24 mA −24 mA
V_{OL}	Maximum Low Level Output Voltage	4.5 5.5	0.001 0.001	0.1 0.1	0.1 0.1	V	I_{OUT} = 50 μA
		4.5 5.5	− −	0.36 0.36	0.44 0.44	V	*V_{IN} = V_{IL} or V_{IH} I_{OL} 24 mA 24 mA
I_{IN}	Maximum Input Leakage Current	5.5	−	±0.1	±1.0	μA	V_I = V_{CC}, GND
ΔI_{CCT}	Additional Max. I_{CC}/Input	5.5	0.6	−	1.5	mA	V_I = V_{CC} − 2.1 V
I_{OZ}	Maximum 3−State Current	5.5	−	±0.5	±5.0	μA	V_I (OE) = V_{IL}, V_{IH} V_I = V_{CC}, GND V_O = V_{CC}, GND
I_{OLD}	†Minimum Dynamic Output Current	5.5	−	−	75	mA	V_{OLD} = 1.65 V Max
I_{OHD}		5.5	−	−	−75	mA	V_{OHD} = 3.85 V Min
I_{CC}	Maximum Quiescent Supply Current	5.5	−	8.0	80	μA	V_{IN} = V_{CC} or GND

*All outputs loaded; thresholds on input associated with output under test.
†Maximum test duration 2.0 ms, one output loaded at a time.

AC CHARACTERISTICS (For Figures and Waveforms − See Section 3 of the ON Semiconductor FACT Data Book, DL138/D)

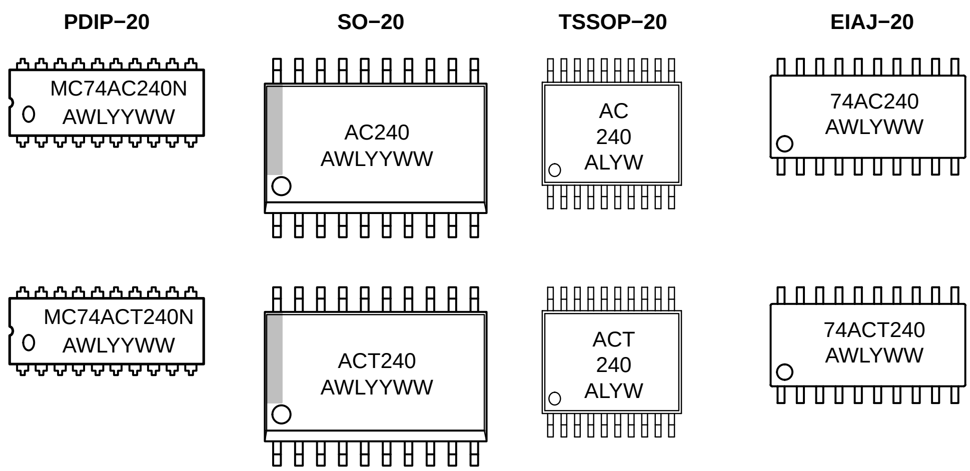
Symbol	Parameter	V_{CC}* (V)	74ACT $T_A = +25°C$ $C_L = 50$ pF			74ACT $T_A = −40°C$ to $+85°C$ $C_L = 50$ pF		Unit	Fig. No.
			Min	Typ	Max	Min	Max		
t_{PLH}	Propagation Delay Data to Output	5.0	1.5	6.0	8.5	1.5	9.5	ns	3−5
t_{PHL}	Propagation Delay Data to Output	5.0	1.5	5.5	7.5	1.5	8.5	ns	3−5
t_{PZH}	Output Enable Time	5.0	1.5	7.0	8.5	1.0	9.5	ns	3−7
t_{PZL}	Output Enable Time	5.0	2.0	7.0	9.5	1.5	10.5	ns	3−8
t_{PHZ}	Output Disable Time	5.0	2.0	8.0	9.5	2.0	10.5	ns	3−7
t_{PLZ}	Output Disable Time	5.0	2.5	6.5	10.0	2.0	10.5	ns	3−8

*Voltage Range 5.0 V is 5.0 V ±0.5 V.

CAPACITANCE

Symbol	Parameter	Value Typ	Unit	Test Conditions
C_{IN}	Input Capacitance	4.5	pF	$V_{CC} = 5.0$ V
C_{PD}	Power Dissipation Capacitance	45	pF	$V_{CC} = 5.0$ V

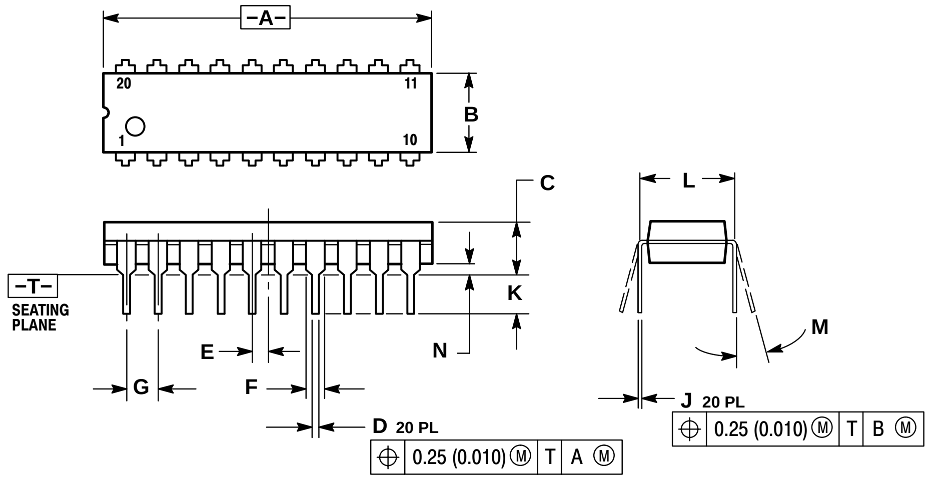
MARKING DIAGRAMS



A = Assembly Location
WL, L = Wafer Lot
YY, Y = Year
WW, W = Work Week

PACKAGE DIMENSIONS

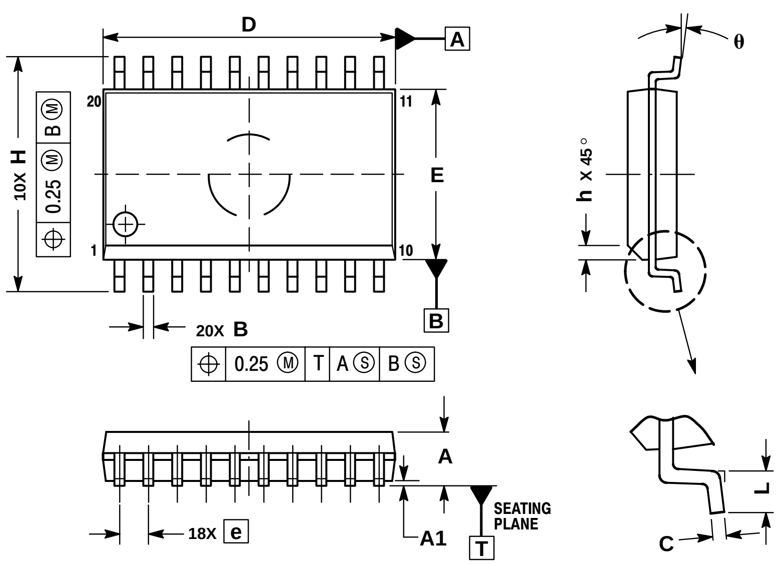
PDIP−20
N SUFFIX
20 PIN PLASTIC DIP PACKAGE
CASE 738−03
ISSUE E



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.
4. DIMENSION B DOES NOT INCLUDE MOLD FLASH.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	1.010	1.070	25.66	27.17
B	0.240	0.260	6.10	6.60
C	0.150	0.180	3.81	4.57
D	0.015	0.022	0.39	0.55
E	0.050 BSC		1.27 BSC	
F	0.050	0.070	1.27	1.77
G	0.100 BSC		2.54 BSC	
J	0.008	0.015	0.21	0.38
K	0.110	0.140	2.80	3.55
L	0.300 BSC		7.62 BSC	
M	0°	15°	0°	15°
N	0.020	0.040	0.51	1.01

SO−20
DW SUFFIX
20 PIN PLASTIC SOIC PACKAGE
CASE 751D−05
ISSUE G

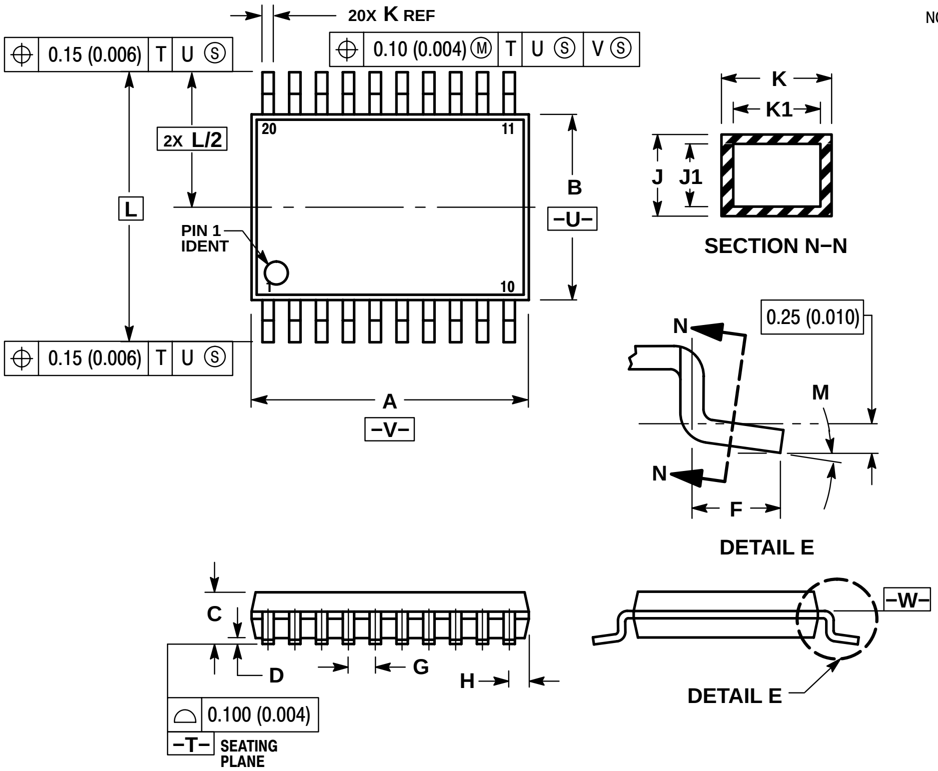


NOTES:
1. DIMENSIONS ARE IN MILLIMETERS.
2. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
5. DIMENSION B DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE PROTRUSION SHALL BE 0.13 TOTAL IN EXCESS OF B DIMENSION AT MAXIMUM MATERIAL CONDITION.

	MILLIMETERS	
DIM	MIN	MAX
A	2.35	2.65
A1	0.10	0.25
B	0.35	0.49
C	0.23	0.32
D	12.65	12.95
E	7.40	7.60
e	1.27 BSC	
H	10.05	10.55
h	0.25	0.75
L	0.50	0.90
θ	0°	7°

PACKAGE DIMENSIONS

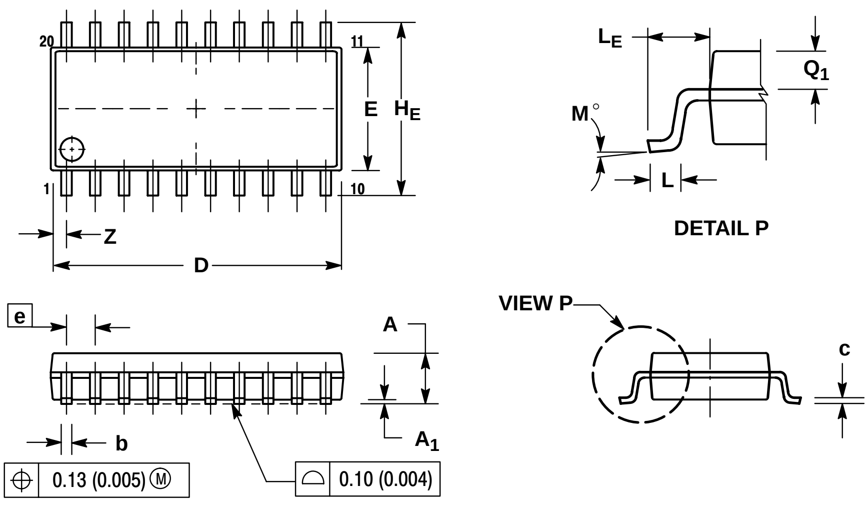
TSSOP−20
DT SUFFIX
20 PIN PLASTIC TSSOP PACKAGE
CASE 948E−02
ISSUE B



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010) PER SIDE.
5. DIMENSION K DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 (0.003) TOTAL IN EXCESS OF THE K DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
7. DIMENSION A AND B ARE TO BE DETERMINED AT DATUM PLANE −W−.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	6.40	6.60	0.252	0.260
B	4.30	4.50	0.169	0.177
C	---	1.20	---	0.047
D	0.05	0.15	0.002	0.006
F	0.50	0.75	0.020	0.030
G	0.65 BSC		0.026 BSC	
H	0.27	0.37	0.011	0.015
J	0.09	0.20	0.004	0.008
J1	0.09	0.16	0.004	0.006
K	0.19	0.30	0.007	0.012
K1	0.19	0.25	0.007	0.010
L	6.40 BSC		0.252 BSC	
M	0°	8°	0°	8°

EIAJ−20
M SUFFIX
20 PIN PLASTIC EIAJ PACKAGE
CASE 967−01
ISSUE O



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS AND ARE MEASURED AT THE PARTING LINE. MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
5. THE LEAD WIDTH DIMENSION (b) DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 (0.003) TOTAL IN EXCESS OF THE LEAD WIDTH DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OR THE FOOT. MINIMUM SPACE BETWEEN PROTRUSIONS AND ADJACENT LEAD TO BE 0.46 (0.018).

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	---	2.05	---	0.081
A_1	0.05	0.20	0.002	0.008
b	0.35	0.50	0.014	0.020
c	0.18	0.27	0.007	0.011
D	12.35	12.80	0.486	0.504
E	5.10	5.45	0.201	0.215
e	1.27 BSC		0.050 BSC	
H_E	7.40	8.20	0.291	0.323
L	0.50	0.85	0.020	0.033
L_E	1.10	1.50	0.043	0.059
M	0°	10°	0°	10°
Q_1	0.70	0.90	0.028	0.035
Z	---	0.81	---	0.032

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